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RESEARCH ARTICLE

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Ambulance clinician perspectives of disparity in prehospital child pain management: A mixed methods study

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Abstract

Background: When children suffer acute pain, the ambulance service is often involved to provide initial assessment, treatment, and transport. Several predictors of effective pain management have been identified, including children who are younger (0-5 years), administered analgesics, and living in homes from more affluent areas.

Objective: To explain previously identified predictors of effective prehospital pain management in children.

Design: Mixed methods sequential explanatory study.

Setting and participants: East Midlands Ambulance Service National Health Service Trust paramedics and emergency medical technicians (EMTs) participated in face-to-face semi-structured interviews. These were audio recorded, transcribed verbatim, and coded using thematic analysis. Meta-inferences were generated and illustrated within a joint display.

Results: Twelve clinicians (9 paramedics and 3 EMTs) were interviewed. Median (interquartile range) age was 43.5 years (41.5, 45.75), 58% were male (n = 7) and 58% were parents (n = 7). Possible explanations were provided for all predictors. Younger children were perceived to express more emotion, were easier to distract, and lived more in the moment than their older counterparts, which explained why younger children were more likely to achieve effective pain management. Analgesics were perceived to have a psychosocial benefit in addition to the pharmacological action. Ambulance clinicians felt that children living in more affluent areas were more likely to achieve effective pain management because the kempt environment facilitated assessment and management and clinicians spent more time on scene; this allowed more time for analgesics to take effect. Participants perceived paramedics to be more confident, and it was found that paramedics were older, more experienced, had a greater scope of practice, and spent more time on scene than EMTs.

Conclusion: Prehospital pain management in children could be improved by facilitating and prioritizing analgesic administration and by ambulance services ensuring a

paramedic, or highly trained clinician, is present on each vehicle, necessitating long-term commitment to staff development.

KEYWORDS
child, deprivation, emergency medical services, emergency medical technicians, mixed methods, pain

1 | INTRODUCTION

When children suffer pain through medical illness or traumatic injury, they are often assessed, treated, and transported to hospital by ambulance.[1] Prehospital pain management in children is considered poor.[1-3] Within the United Kingdom (UK), a recent study showed that only 39% of children suffering acute pain achieved effective pain management (abolition or reduction of pain ≥2 out of 10).[4] In Australia, a study showed that 55% of children suffering severe pain received no analgesics.[1] This is despite pain management being considered an essential human right.[5]

The consequences of inadequate pain management in children suffering acute pain include posttraumatic stress disorder[6,7] and altered pain perception.[8,9] Prehospital pain management in children is extremely complex[10]; difficulty assessing pain and administering analgesics have been identified as key barriers to effective management.[11,12] Recent efforts to improve pain management include the introduction of intranasal analgesics.[13,14] Although a promising solution, there are likely to be many unrecognized barriers to prehospital pain relief in children.[14] These require a mixed methods approach to better clarify and delineate the problems associated with effective management.[11]

We have previously identified a number of predictors of effective pain management in children within a UK ambulance service.[4] Children, who were younger (0-5 years) compared to older (12-17 years), administered analgesics, attended by a paramedic, or living in an area of medium (index of multiple deprivation [IMD] 4-7) or low (IMD 8-10) deprivation compared to those living in an area of high (IMD 1-3) deprivation were more likely to achieve effective pain management. We aimed to explain these four predictors, along with two other previously identified predictors; child sex (male) and type of pain (traumatic),[15,16] using the perspectives of ambulance clinicians within a mixed methods approach.

2 | METHODS

2.1 | Study design and setting

A mixed methods sequential explanatory design was adopted.[17] The initial quantitative phase identified predictors of effective pain management and has previously been published.[4] This paper reports the second phase, constituting a generic qualitative study[18] along with the integration techniques used to help explain the findings of the initial cross-sectional study. We have described the generic qualitative study methods and integration techniques separately. See Figure 1 for the diagram of procedures.

The study was performed within the East Midlands Ambulance Service National Health Service (NHS) Trust (EMAS). EMAS is one of 10 ambulance services in England and is based in the Midlands. It serves a population of 4.8 million, including an estimated 996 348 children (21%) under the age of 18 years.[19] It covers an area of 16 666 km^2 across six counties covering both urban and rural areas.[20] Approximately, 2500 emergency calls are received per day and EMAS employs approximately 2300 ambulance staff.

2.2 | Generic qualitative study

2.2.1 | Sampling

All EMAS clinicians were invited to participate by email and service newsletter. Clinicians who expressed an interest were sent a participant information sheet, a privacy notice, and had the opportunity to ask any questions before they were invited for interview.

Participants were selected purposively using maximum variation sampling.[21] The results of our cross-sectional study[4] informed the

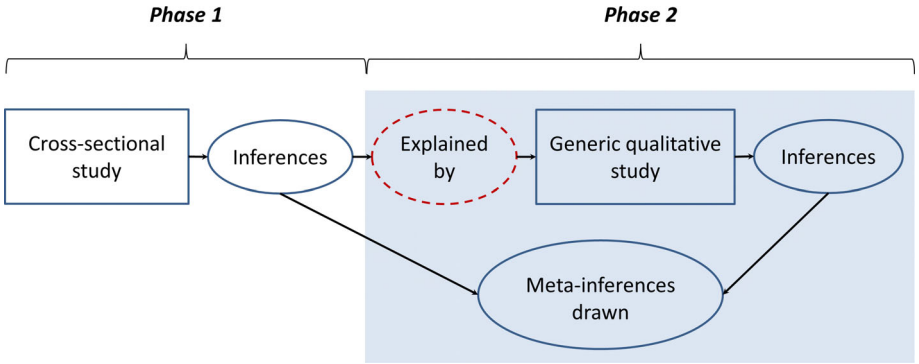

FIGURE 1 Diagram of procedures. Inference—"a conclusion or interpretation in response to a research question, made on the basis of the results of the data analysis" Teddlie and Tashakkori[31] (p. 336). Meta-inference—"a conclusion generated by integrating the inferences obtained from the qualitative and quantitative strands of a mixed methods study" Adapted from Teddlie and Tashakkori[31] (p. 338)

sampling of this generic qualitative study, ensuring that paramedics and emergency medical technicians (EMTs) were recruited. We included clinicians of both sex with a range of clinical experience.

Sampling continued until data saturation was complete; no new codes or meaning were gained from additional data.[22] Interviews were conducted from August to November 2019.

Inclusion criteria:

- Employed by EMAS as a paramedic, EMT, or emergency care practitioner (paramedic with enhanced primary care skills).
- Working on active front line duties during 12 months prior to interview.

2.2.2 | Data collection

Data were collected from face-to-face semi-structured interviews via audio recordings. An interview schedule was used as a prompt (see Appendix S1); the development of the interview schedule was informed by previous evidence and the initial cross-sectional study.[4] Written consent was gained from participants prior to the interview starting. Participants were anonymized by assigning a sequential number preceded by "P" for paramedics and "T" for EMTs; this labeling was necessary to help explain the "paramedic crew" predictor previously identified.[4]

Each participant was asked to provide a vignette as an ice-breaker to start the interview.[23] This was used to compare hypothetical scenarios to elicit explanation and reasoning as to why the participant felt there may have been a different outcome or different management between the two scenarios. For example, if the participant used a traumatic injury vignette, the same case was hypothesized but for a medical source of pain. The participant was then asked whether they would expect any differences in the two scenarios and to explain their reasoning.

Interviews were performed by GAW who was positioned within the critical realist framework.[24] As a paramedic and former EMT, GAW shared the culture and prior understanding of the clinical participants[25] enabling the pursuit of more in depth details, as simpler concepts and terminology did not require explanation. There was a minor concern that this may have created "blind spots"[26] where seemingly simple concepts that are taken for granted may have been overlooked.

2.2.3 | Data analysis

Audio recordings were transcribed verbatim by GAW. Thematic analysis[27] was used to analyze the data within NVivo version 12. The steps of analysis included; (a) familiarization with the data, (b) generating initial codes, (c) searching for themes, (d) reviewing themes, (e) defining and naming themes, and (f) producing the report.[27] Thematic analysis was performed by GAW, with all authors involved in the discussion and iterative refining of codes and themes.

The analysis was considered mainly deductive as the interview schedule provided a framework for theme development.[27] Data analysis was considered semantic[27]; it was deemed unnecessary to go beyond the semantic level of data as the complexity of this study lies within the mixed methods approach, specifically within the integration of data.

Respondent validation was not performed as its ability to provide validity is questionable; a thorough analysis of qualitative data often involves navigating contradictions and conflicts between participants; neither participant is right or wrong, but the conflict itself provides useful insights.[21]

2.3 | Integration

Integration between the previously published quantitative study (Quan)[4] and the qualitative study (Qual) described in this paper occurred at a number of levels. Firstly, at the design level, the sequential explanatory approach ensured integration through the inherent explanation.[28] At the methods level, "connecting" occurred[28] via the strategic sampling of participants and "building" occurred[28] via the development of the interview schedule, both informed by the results of the Quan study. We also "followed a thread"[29] as we were unable to fully understand some predictors using Qual data alone; therefore, we returned to the Quan data and performed additional analyses to elicit new understanding. Finally, at the interpretation and reporting level, "triangulation"[29] was used to determine when data agreed, expanded, or contradicted each other, and the data were presented using a joint display[30] to show the meta-inferences. See Figure 2 for the illustration of integration.

Where we were unable to fully explain some of the predictors qualitatively, we performed additional analyses using the original Quan data from our initial study.[4] We compared characteristics between the "paramedic" and "nonparamedic" crews and between the levels of deprivation using the *t*-test (means), binominal probability test (proportions), and Wilcoxon rank-sum test (medians). During the development of meta-inferences, adjusted odds ratios and 95% confidence intervals for the included predictors were used from our initial Quan study.[4]

2.4 | Ethical considerations

This study was carried out in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki). Ethical approval was gained from the National Health Service Health Research Authority following research ethics committee approval (18/NI/0120). Approval was also gained from the Clinical Audit and Research Unit, East Midlands Ambulance Service NHS Trust. All participants gave informed written consent for participation in the qualitative study.

2.5 | Patient and public involvement

The research question and study design were informed through discussion with the Healthier Aging Patient and Public Involvement

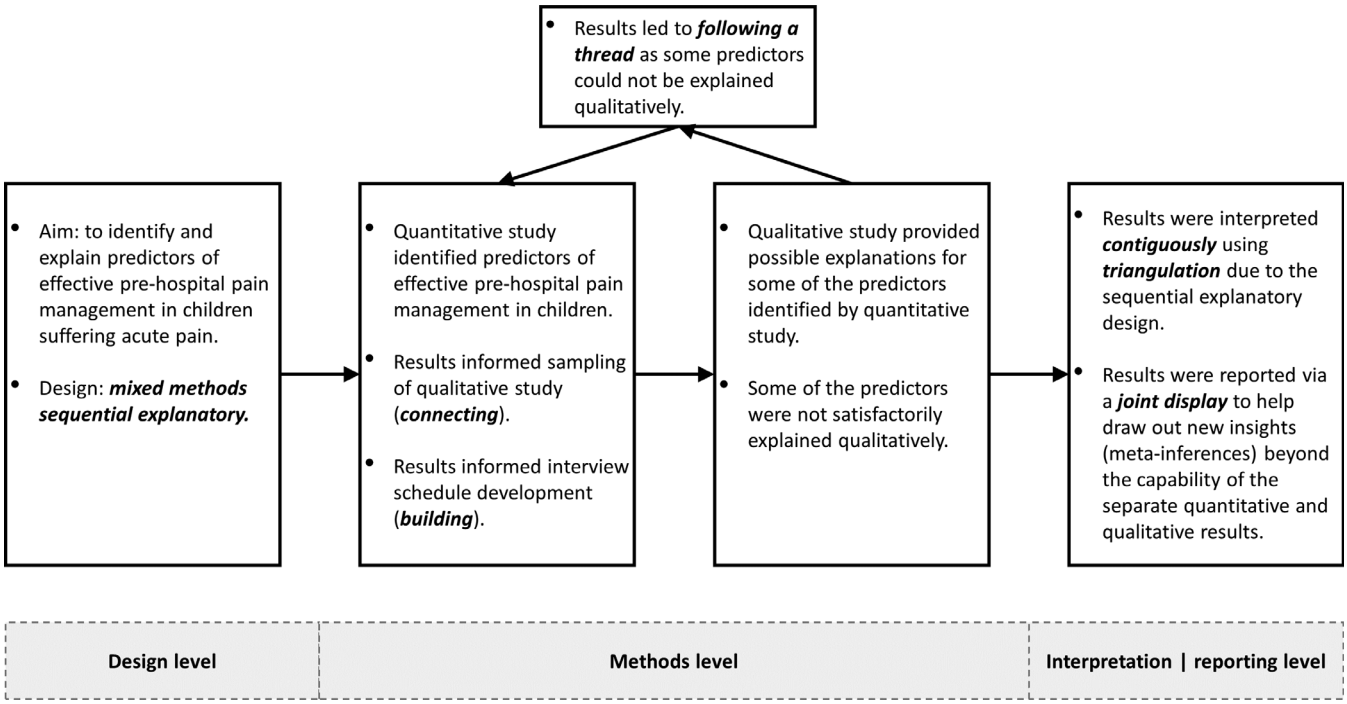

FIGURE 2 Integration achieved within this study

(HaPPI) group at the University of Lincoln. It was concluded that pre-hospital pain management in children was an important topic of research and that this mixed methods approach should help develop a more comprehensive understanding of the problem.

3 | RESULTS

Twenty-five clinicians expressed an interest and 12 participants were included in this study, see Appendix S1 for the summary of participant characteristics. Median (interquartile range [IQR]) age was 43.5 (41.5, 45.75) years, 58% were male, 75% were paramedics, median (IQR) experience was 12 (4.25, 15.5) years, and 58% were parents.

A thematic map was created to illustrate main themes and sub-themes identified during the qualitative study, see Figure 3.

3.1 | Themes with supporting quotations

3.1.1 | Child age

Participants stated that younger children expressed more emotion, were easier to distract, and they lived more in the moment that their older counterparts:

> "*the younger ones very much live in the moment, I've either got pain or I haven't, there's nothing much in between the two so, I think, anything that you do for younger children tends to have a more immediate effect than say, the older age group.*"
>
> Participant P02

3.1.2 | Analgesic administration

Participants stated that analgesics helped to reduce physiological pain and psychological distress:

> "*And also then you've got the, you're giving him something for the pain so you've got the psychological side that 'I've had something for the pain' as well.*"
>
> Participant P06

3.1.3 | Paramedic crew

There was conflict and a lack of clarity around the explanation of the paramedic crew predictor with many participants stating that there was no perceived difference in the way paramedics and EMTs managed children, concluding that people skills were more important:

> "*it's not just as I say being a paramedic it's, it's anybody you know, if I was with another technician or even an ECA [emergency care assistant] it's, it's just that*

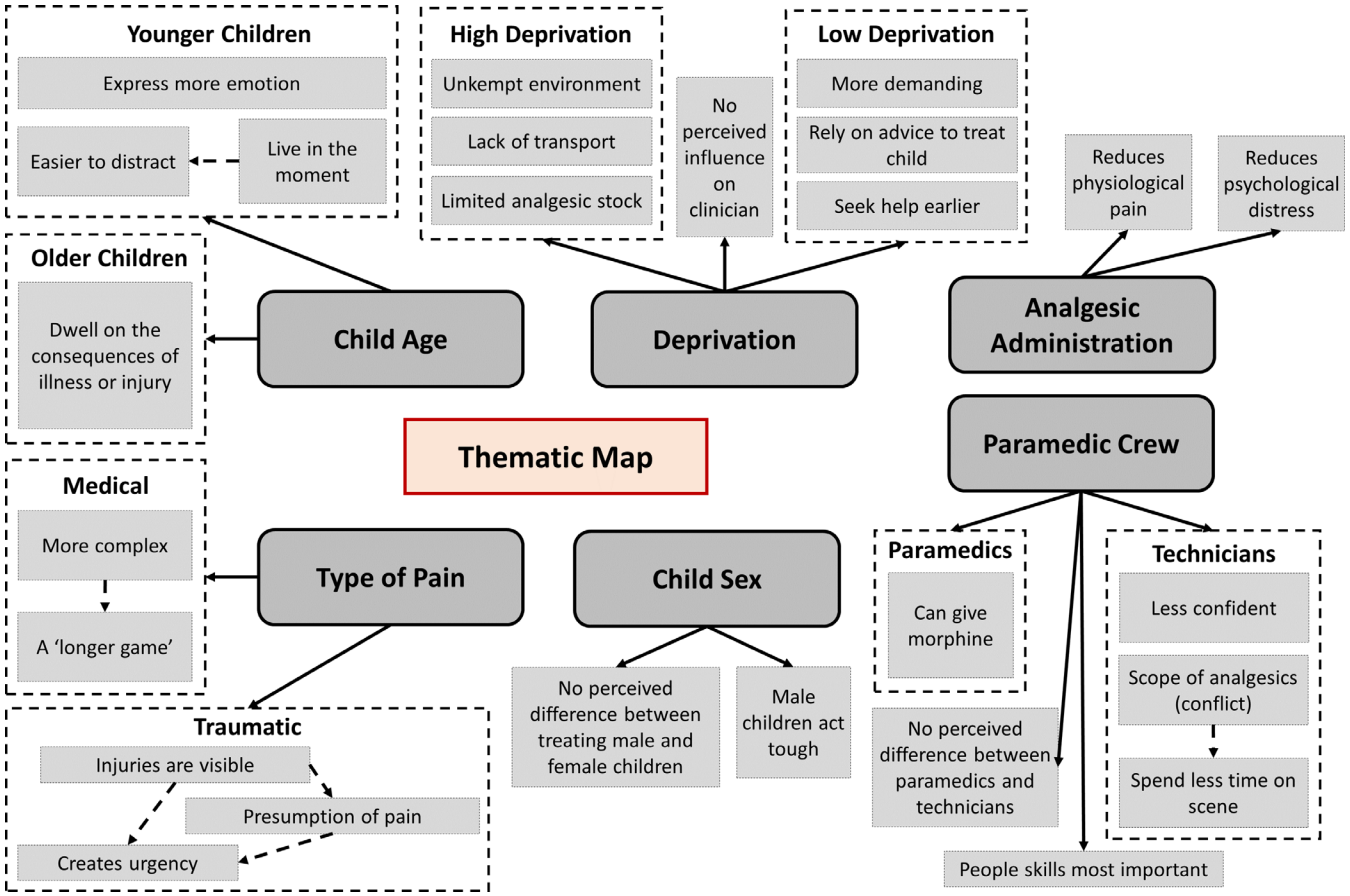

FIGURE 3 Thematic map

individual person's ability to be able to help control the situation and not get themselves erm, worked up."

Participant T01

3.1.4 | Deprivation

There was conflict surrounding level of deprivation; some participants stated that deprivation did not influence their practice and others argued for and against the predictor. Some participants perceived that the home environments of more deprived areas were unkempt, making the management of children on scene more difficult:

"*It definitely made a difference in terms of the hou[se], the environment, erm, the environment for the male patient was clean and tidy erm, wealthy parents and I could, they had toys all laid out and it was nice and neat and clean whereas the female patient was in a house that was, barely enough room to walk let alone sit down anywhere, definitely a poorer family.*"

Participant P05

Conversely, some participants felt that parents from more affluent areas were more demanding:

"*So they'll [more affluent families] want us here yesterday, and they'll want that child treating, and they won't necessarily agree that we have the tools to treat them.*"

Participant P07

3.1.5 | Child sex

Most participants stated that they would not expect to see a difference in the way boys and girls were treated. Some participants offered an explanation as to why male children may be more likely to achieve effective pain management; male children are more bravado, denying they need treatment or perhaps more readily agreeing that interventions have worked:

"*perhaps in … school children, probably more so in, in males, erm, there might be an expectation to, erm, tough it out in front of their school mates as opposed to actually, [laughter] submitting and going yes … just give me*

something, probably thinking more senior school now, so you know, essentially, you, they're adults aren't they, near enough but, perhaps the, early teens they might be a little bit more, bravado, and erm, 'no, no I'm alright I'm alright I can manage'."

Participant P01

3.1.6 | Type of pain

Participants felt that children suffering traumatic pain were more likely to achieve effective pain management and provided clear explanation for this, although this predictor was not statistically significant.[4] Participants perceived traumatic pain as more visible, leading to a presumption of pain and ultimately creating more urgency:

"*Yeah so physically seeing the injury, and the distress of the child, which is why I think we're probably better at trauma than medical because there's, if you see broken bones and bleeding bits and burns and scalds, it makes it really easy to go 'I know this kid's in pain', whereas it might not be as easy to look at somebody that's a bit gripey with belly ache at 3-years-old to fully appreciate how much pain this kid's in.*"

Participant P08

A comprehensive list of quotations informing each theme can be found in Appendix S1.

3.2 | Integration

Considering the conflict and lack of clarity regarding the "paramedic crew" predictor, we "followed the thread"[29] back to the quantitative data and explored the differences between the characteristics of the senior clinicians within the paramedic vs the nonparamedic (EMT) group. We compared age, clinical experience, and initial pain scores of children attended by both groups, as we felt that confounding by indication may have occurred, as paramedics were perhaps more likely to be dispatched to higher acuity patients suffering more pain than EMT crews. We also compared "on-scene" time, as participants perceived that EMTs spend less time on scene than paramedics (see Figure 3).

Table 1 shows that the paramedic group contained a significantly higher percentage of female clinicians (P = 0.0180), were significantly

TABLE 1 Comparison of senior clinician characteristics between paramedic and nonparamedic group

Characteristic	Paramedic crew (n = 1603)	Nonparamedic crew (n = 709)	*P*-value[a]
Senior clinician experience, y			
Mean (SD)	12.5 (8.7)	7.0 (7.5)	<.0001
Median (IQR)	11 (5, 18)	3 (2, 9)	<.0001
Senior clinician sex, n			
Male (%)	927 (57.8)	422 (59.5)	.4468
Female (%)	567 (35.4)	215 (30.3)	.0180
Not known (%)	109 (6.8)	72 (10.2)	.0056
Senior clinician age, y			
Mean (SD)	43.6 (10.1)	40.7 (10.8)	<.0001
Median (IQR)	44 (37, 51)	41 (31, 49)	<.0001
Patient initial numeric pain score[b]			
Median (IQR)	7 (5, 8)	7 (4, 8)	.5782
Mean (SD)	6.2 (2.7)	6.1 (2.7)	.4116
Patient initial visual pain score[c]			
Median (IQR)	4 (2, 6)	4 (2, 6)	.1099
Mean (SD)	4.6 (2.8)	4.3 (2.7)	.0164
Characteristic	**Paramedic crew (n = 1306)**	**Nonparamedic crew (n = 586)**	***P*-value[a]**
On scene time, min			
Mean (SD)	34.63 (18.61)	30.93 (17.71)	.0001
Median (IQR)	31 (22-44)	28 (20-37)	<.0001

Note: Data used for this analysis were the same data used for Whitley et al.[4]
Abbreviations: IQR, interquartile range; SD, standard deviation.
[a]*t*-test (means); binomial probability test (proportions); Wilcoxon rank-sum test (medians).
[b]Numeric pain rating scale (0-10).
[c]Wong & Baker FACES pain scale.

TABLE 2 Index of multiple deprivation vs on scene time and analgesic administration

Characteristic	Index of multiple deprivation					*P*-value* (high vs low)
On scene time, min	High (n = 553)	Med (n = 468)	Low (n = 287)	Missing (n = 584)	All (n = 1892)	
Mean (SD)	31.65 (17.13)	34.09 (21.05)	37.35 (20.32)	32.84 (15.89)	33.49 (18.41)	<.0001
Median (IQR)	26 (20-38)	28 (22-42)	33 (24-46)	31 (22-39)	28 (22-42)	<.0001
Analgesic administered, n	High (n = 656)	Med (n = 580)	Low (n = 349)	Missing (n = 727)	All (n = 2312)	
Yes (%)	397 (60.5)	382 (65.9)	229 (65.6)	455 (62.6)	1463 (63.3)	.1124
No (%)	259 (39.5)	198 (34.1)	120 (34.4)	272 (37.4)	849 (36.7)	

Note: Data used for this analysis were the same data used for Whitley et al.[4] High—IMD 1-3, Med—IMD 4-7, Low—IMD 8-10.
**P*-value calculated using the "high" and "low" deprivation data, *t*-test (means); binomial probability test (proportions); Wilcoxon rank-sum test (medians).

older ($P < .0001$), more experienced ($P < .0001$), and attended children suffering a higher mean initial visual pain score than nonparamedic senior clinicians ($P = .0164$); however, there was no significant difference between initial numeric pain scores. We also found that paramedics spent on average (mean [SD]) 34.63 (18.61) minutes on scene vs 30.93 (17.71) minutes for nonparamedics ($P = .0001$).

In addition to this, we also "followed the thread"[29] for deprivation. We explored the on-scene time of clinicians and rates of analgesic administration between the groups of deprivation.

Table 2 shows that clinicians attending children from areas of high deprivation spent significantly less time on scene compared to children from areas of low deprivation ($P < .0001$). Clinicians also administered analgesics less frequently when attending children from areas of high deprivation (60.5%) compared to children from areas of low deprivation (65.6%); however, this difference was not statistically significant ($P = .1124$).

3.2.1 | Meta-inferences

We used triangulation[29] to integrate the inferences of the cross-sectional study[4] and generic qualitative study and displayed the data as a joint display.[30] See Table 3 for the joint display.

Table 3 shows the meta-inferences from this study. These meta-inferences were deemed good quality after being assessed for design quality and interpretive rigor using the integrative framework for inference quality[31] (see Appendix S1).

4 | DISCUSSION

Perceptions of ambulance clinicians regarding the predictors of effective pain management in children were explored, and meta-inferences were developed which offer possible explanations for the observed disparity in quality of care[4] and a deeper understanding of this complex phenomenon.

Participants perceived that younger children expressed more emotion, displaying more fear and anxiety. Paramedics report finding it difficult to distinguish between physiological pain and a child's display of fear and anxiety caused by the stress of the situation.[11] Fear and anxiety are important emotions to consider in the perception of acute pain[32] as they are likely to increase the perception of pain[33-35] which in turn increases fear and anxiety, creating a vicious cycle.[33,36] Reducing the fear and anxiety experienced by children during an ambulance call-out is likely to reduce their perceived level of pain by disrupting this cycle. This is arguably easier to achieve in younger children due to the greater scope for reduction, given their initial heightened emotional state and because younger children were perceived to live more in the moment.

Analgesic administration was perceived to have physiological and, perhaps more importantly, psychological effects. These psychological effects cannot accurately be described as the placebo effect or "placebo analgesia"[37] as this would require the absence of analgesic administration. A more accurate description would be the psychosocial component of treatment. This phenomenon was described by Colloca et al[38] when exploring covert vs overt analgesic administration to patients suffering Parkinson's disease. It was found that those administered overt analgesics achieved a faster pain reduction than those administered covert analgesics. Therefore, the administration of analgesics to children is likely to have effects in addition to the pharmacological action of the drug; they are likely to have psychosocial effects. This is an important consideration for ambulance service clinicians.

Some participants perceived the homes of less affluent families as unkempt and less welcoming, leading to more challenging patient assessment and management. Medical consultations in enhanced environments (increased space, light, and greater comfort) improve patient-clinician communication, reduce patient anxiety, and improve the satisfaction of patients and clinicians.[39] Clinicians spent significantly more time on scene when attending children who lived in more affluent areas, allowing more time for administered analgesics to take effect. The relationship between unkempt environments and early extrication is unclear, as other explanations for reduced on-scene time may be present, such as unconscious clinician bias[40] or ethnic minority differences where language or cultural barriers may precipitate.[41] Some participants felt that more affluent parents were more demanding; there was a small

TABLE 3 Joint display showing meta-inferences

Quantitative findings		Qualitative findings	
Predictors of effective pain management[a]	**AOR[b] (95% CI)**	**Themes**	**Meta-inference**
Younger (0-5 y) vs older children (12-17 y)	1.53 (1.18-1.97)	• Younger children express more emotion • Younger children are easier to distract • Younger children live in the moment • Older children dwell on the consequences of illness of injury	Younger children achieve more effective pain management than older children. This was perceived to be because younger children express more emotion, therefore, are easier to distract, and they live more in the moment than their older counterpart.
Children administered analgesics vs no analgesics	2.26 (1.87-2.73)	• Analgesic administration reduces physiological pain • Analgesic administration reduces psychological distress	Children administered analgesics achieve more effective pain management than those who are not. This was perceived to be because analgesics reduce physiological pain and psychological distress.
Children attended by a paramedic vs nonparamedic (EMT)	1.46 (1.19-1.79)	• Paramedics can administer morphine • Technicians are less confident • Technicians spend less time on scene • Technician scope of analgesics (conflict) • People skills most important • No perceived difference between paramedics and technicians	Children attended by paramedics achieve more effective pain management than those attended by EMTs. This was perceived to be because paramedics are older, more experienced, more confident, have a greater scope of practice, and spend more time on scene than EMTs.
Children living in an area of low (IMD 8-10) vs high (IMD 1-3) deprivation	1.37 (1.04-1.80)	• High—limited analgesic stock • High—lack of transport • High—unkempt environment • Low—more demanding • Low—rely on advice to treat child • Low—seek help earlier • No perceived influence on clinician	Children living in areas of low deprivation achieve more effective pain management than those in areas of high deprivation. This was perceived to be because the kempt environment facilitates assessment and management; clinicians spend more time on scene, and their parents were perceived as more demanding.
Male vs female children[c]	1.17 (0.98-1.39)	• Male children act tough • No perceived difference between treating male and female children	There was no statistical difference in rates of effective pain management between male and female children. This was perceived as accurate as most participants stated they expected no difference. This finding conflicts with previous research and therefore requires further investigation.
Children suffering traumatic vs medical pain[c]	1.18 (0.97-1.43)	• Traumatic injuries are visible • There is a presumption of pain in trauma • Trauma creates urgency • Medical pain is more complex • Medical pain is a "longer game"	There was no statistical difference in rates of effective pain management between children suffering traumatic and medical pain. The qualitative finding along with previous research conflicted with this lack of statistical difference; therefore, further research is required.

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; EMT, emergency medical technician; IMD, index of multiple deprivation.
[a]Defined as the abolition or reduction of pain by ≥2 out of 10.
[b]Adjusted for patient age, patient sex, type of pain, senior clinician experience, analgesic administration, nonpharmacological treatment administration, paramedic crew, hospital travel time, and index of multiple deprivation.
[c]Not significant, however, other studies have found these predictors significant.

but nonsignificant difference in the rate of analgesic administration between areas of low (65.6%) and high (60.5%) deprivation ($P = .1124$).

Although the predictor "child sex" was not statistically significant,[4] previous studies have found that male children may be more likely to achieve effective pain management than female children.[15,16] The views and experiences of the participants seemed to validate the nonsignificant finding, as most participants did not believe a disparity existed. There was an explanation offered for the existence of the disparity; boys act tough, conforming to perceived social norms. However, a recent systematic review found no major differences in the way parents raise boys and girls.[42]

Although traumatic pain was not identified as a predictor of effective pain management,[4] participants perceived that children suffering traumatic pain were more likely to achieve effective pain management compared to children suffering medical pain and provided explanations for this. Traumatic pain has been identified as a predictor of effective pain management in previous studies[14-16]; perhaps, our estimate of effect was more conservative, given the number of included

independent variables (n = 9).[4] Participants felt that cases of medical pain were more complex and required more due diligence prior to analgesic administration; therefore, this disparity may be challenging to address.

Participant perceptions coupled with the integration of quantitative data from our initial study[4] found that paramedics were older, more experienced, more confident, had a greater scope of practice than EMTs, and spent more time on scene. The enhanced scope of practice likely influences the disparity as morphine sulfate (intravenous and oral) provides greater pain score reductions for children in the prehospital setting than oral paracetamol or inhaled nitrous oxide.[43] Considering that paramedics spent significantly more time on-scene, interventions had more time to take effect, contributing to the observed disparity.

The strength of this study lies in its mixed methods approach, combining observation with explanation to create a deeper understanding of prehospital child pain management. To our knowledge, this is the first mixed methods study explaining predictors of effective pain management for children in the prehospital setting. This deeper understanding provides more clarity to the complex and convoluted phenomenon of prehospital child pain management.

4.1 | Limitations

Due to the qualitative nature of the generic qualitative study, the results are not considered generalizable to other populations or contexts; however, there is an element of conceptual generalizability and transferability.[21] Participants within this study may have unconscious bias that could have influenced their responses. For these reasons, we were unable to provide definitive explanations for the identified predictors, as other explanations may be valid. Instead, we were able to provide possible explanations and deepen our understanding of prehospital pain management in children. Due to the clinical background of the interviewer, "blind spots" were a concern,[26] where seemingly simple concepts that are taken for granted may have been overlooked. The low number of EMT participants could be perceived as a limitation; however, we felt that code and meaning saturation was achieved,[22] and that further EMT data were unlikely to provide any new insights.

4.2 | Implications for clinical practice

Analgesic administration should be encouraged when indicated, even if the onset time is considered slow, as there are potentially psychosocial benefits in addition to the pharmaceutical effects. A recent systematic review also concluded that efforts to facilitate analgesic administration should take priority.[44] Ambulance services should aim to staff all vehicles with at least one paramedic, necessitating long-term commitment to developing staff. Clinicians should consider any unconscious (implicit) bias they may have by evaluating "gut" reactions to specific groups of patients and what impact this has on patient care.[40]

4.3 | Implications for future research

Further research involving children and parents is required to explore the conflict regarding child sex. Children suffering medical pain may be disadvantaged in terms of achieving effective pain management; further research is required to explore this disparity. Due to the depth and complexity of deprivation, further research is recommended to corroborate these findings.

5 | CONCLUSION

Prehospital pain management in children could be improved by facilitating and prioritizing analgesic administration and by ambulance services ensuring a paramedic, or highly trained clinician, is present on each vehicle, necessitating long-term commitment to staff development. Due to the complex nature of this phenomenon, some aspects require further exploration, including child sex, type of pain, and level of deprivation.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

AUTHOR CONTRIBUTIONS

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Gregory Adam Whitley had full access to all the data in this study and acts as guarantor for the integrity of the data and the accuracy of the data analysis.

TRANSPARENCY STATEMENT

The lead author confirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned have been explained.

DATA AVAILABILITY STATEMENT

The authors confirm that the data supporting the qualitative findings of this study are available within the article and its supplementary materials, see Appendix S1.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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